

ONTARIO MINISTRY OF ENVIRONMENT  
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1966 OPERATING SUMMARY

**BERTIE**  
**water**  
**treatment**  
**plant**

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.A56  
B47  
1966  
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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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1966**

Bertie : water treatment plant.  
81616



ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Bertie Local Advisory Committee,  
Township of Bertie.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the  
Bertie Water Treatment Plant, OWRC Project No. 59-W-47.

It is hoped that our joint participation in efforts to protect your water  
will have even more success in the coming year.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,  
General Manager.



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VICE-CHAIRMAN

D. S. CAVERLY  
GENERAL MANAGER

W. S. MACDONNELL  
COMMISSION SECRETARY

General Manager,  
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Bertie Water Treatment Plant, OWRC Project No. 59-W-47.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

A handwritten signature in dark ink, appearing to read "B. C. Palmer".

B. C. Palmer, P. Eng.,  
Director,  
Division of Plant Operations.



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## FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.



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**B E R T I E**  
**water treatment plant**

operated for

THE TOWNSHIP OF BERTIE

by the

ONTARIO WATER RESOURCES COMMISSION

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Operations Engineer: R. S. McKittrick

801 Bay Street Toronto 5



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## **'66 REVIEW**

The Township of Bertie Water Treatment Plant operated successfully in 1966, processing a total of 469.93 million gallons of water. This is an increase of 26.5% over 1965. A peak flow of 3.51 M. G. D. was pumped in July.

The total operating costs for 1966 were \$45,349.85 for a cost of \$96.51 per million gallons. This is a decrease of 15.2% from the 1965 cost per million gallons and is due to the increase in plant flow in 1966.

The treated water quality was satisfactory in 1966 with a slight increase in treated water turbidities noted during the year. The bacteriological quality of the water was entirely satisfactory on the basis of bacteriological samples taken during the year.

### **PROJECT STAFF**

The staff complement at the Bertie Township plant consists of five regular employees and one casual. There is 24 hour supervision of the plant, including both process and equipment. During 1965, operator J. Donnelly retired due to ill health and was replaced by C. Clark, the former casual operator. The position vacated by Mr. Clark was filled by L. Holmes.

## PROJECT COSTS

NET CAPITAL COST (Final) (Long Term Debt to OWRC)	\$ <u>763,735.45</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	\$ <u>96,593.93</u>

### BILLINGS

Net Operating	\$ 45,349.85
Debt Retirement	15,412.00
Reserve	4,349.68
Interest Charged	<u>42,969.53</u>
TOTAL	\$ <u>108,081.06</u>

### RESERVE ACCOUNT

Balance at January 1, 1966	\$ 25,505.30
Deposited by Municipality	4,349.68
Interest Earned	<u>1,506.22</u>
	\$ 31,361.20
Less Expenditures	--
Balance at December 31, 1966	\$ <u>31,361.20</u>

## MONTHLY OPERATING COSTS

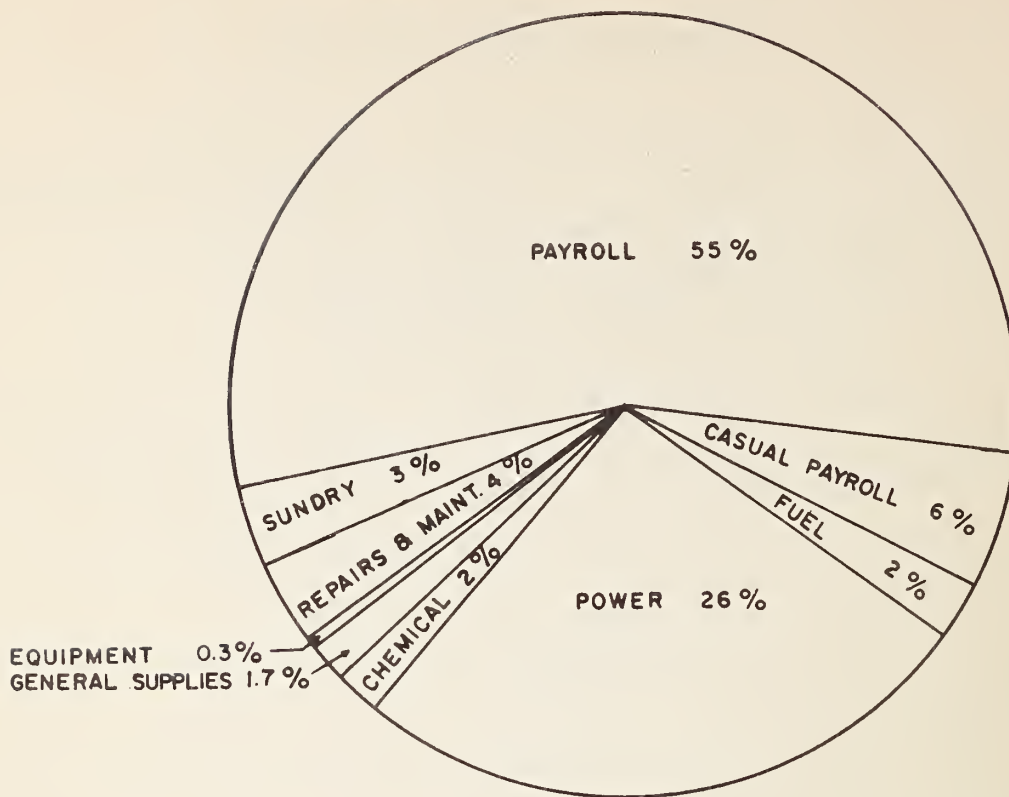
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY
JAN	2003.70	1839.21	142.56				3.28			18.65
FEB	3246.59	1790.74	142.56	181.78	886.87	123.75	46.29			74.60
MARCH	3171.80	1838.13	134.64	161.78	866.70		69.43		60.42	40.70
APRIL	4349.96	3058.73	145.18	141.53	866.11		67.23	76.74		(5.56)
MAY	3239.01	1903.41	114.80	133.78	900.79	14.00	92.34			79.89
JUNE	4016.75	2096.12	89.63	84.78	912.16	93.00	63.41		9.94	667.71
JULY	4387.79	1886.88	275.90	21.18	1033.13	185.63	35.20		907.73	42.14
AUG	4317.36	1982.61	307.66	4.38	1445.04	329.51	40.35	34.58	66.94	106.29
SEPT	5474.85	3261.39	492.27	4.18	1303.52		65.15		291.08	57.26
OCT	3323.53	1660.47	454.71	6.38	999.02		59.83		120.94	22.18
NOV	3297.86	1929.26	189.74	22.78	919.82	103.13	80.83		6.71	45.59
DEC	4520.65	1913.13	102.40	200.85	1843.70		131.06	42.12	175.23	112.16
TOTAL	45349.85	25160.08	2592.05	963.40	11976.86	849.02	754.40	153.44	1638.99	1261.61

BRACKETS INDICATE CREDIT

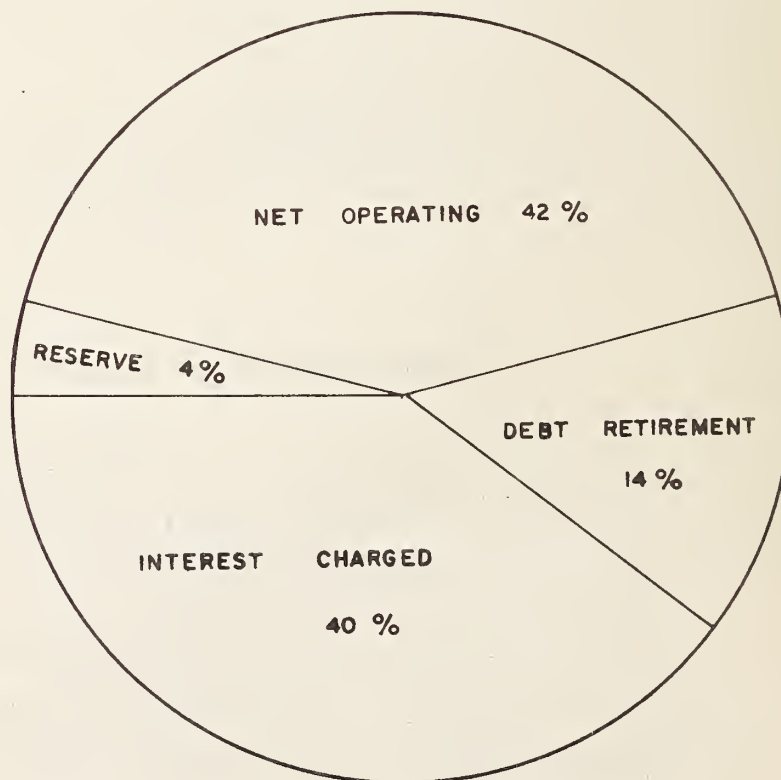
## YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER THOUSAND GALLONS
1963	387,069	\$38,040.12	\$0.10
1964	381,524	\$40,425.88	\$0.11
1965	370,564	\$42,165.16	\$0.11
1966	469,934	\$45,349.85	\$0.10

## 1966 OPERATING COSTS



## TOTAL ANNUAL COST





## Process Data

### GENERAL

The treatment of water at the Bertie Township plant consists of raw water screening, microstraining to remove algae and gross solids, and disinfection by the addition of chlorine.

The following data provide information regarding plant flows, the quality of raw and treated water and the chlorine dosage necessary to maintain a safe product.

### FLOW

During 1966 a total of 469.93 million gallons of water was supplied to industries and residents in the municipality. The average daily flow was 1.29 million gallons, up 26.5% from 1965 and the maximum daily flow of 3.51 million gallons occurred on July 17, 1966.

Flows were again characteristically high in June, July and August during the racing and peak tourist season. The trend continued towards higher average daily flows during the year with a more abrupt increase in flow during the peak months than has been experienced in any previous year. The probability plot of total daily flows indicates the above noted features.

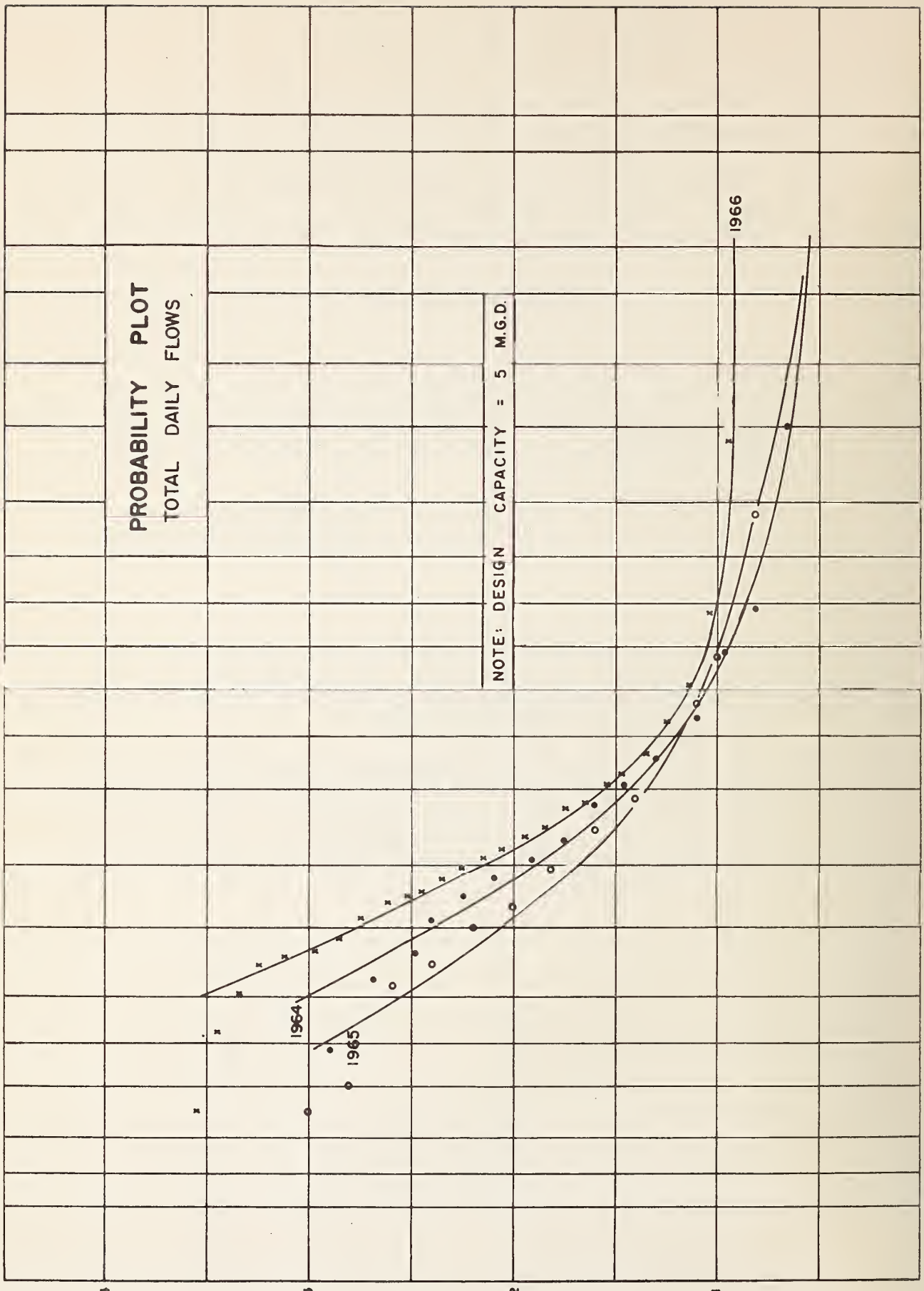


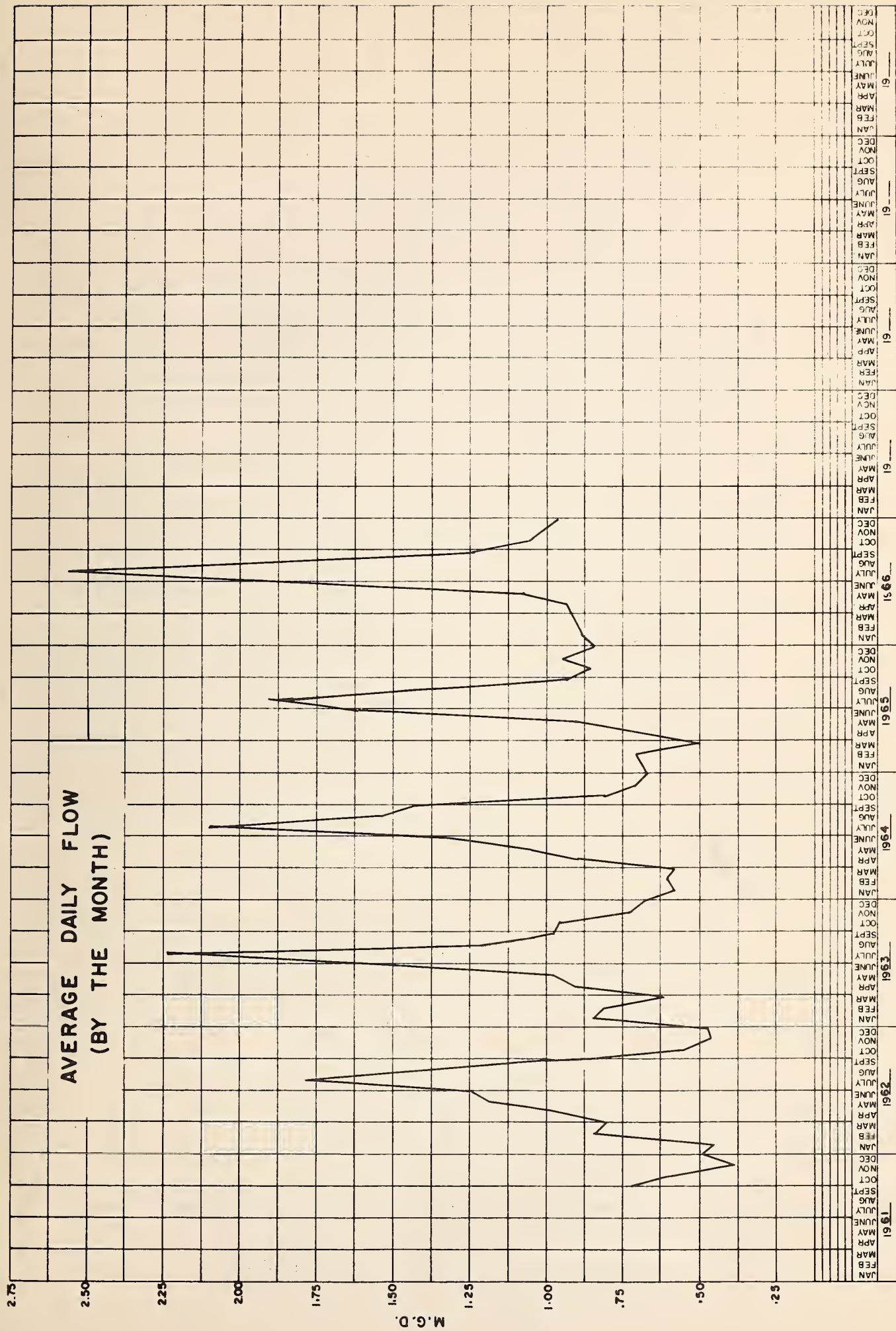
MILLION GALLONS PER DAY

# PROBABILITY PLOT TOTAL DAILY FLOWS

NOTE: DESIGN CAPACITY = 5 M.G.D.

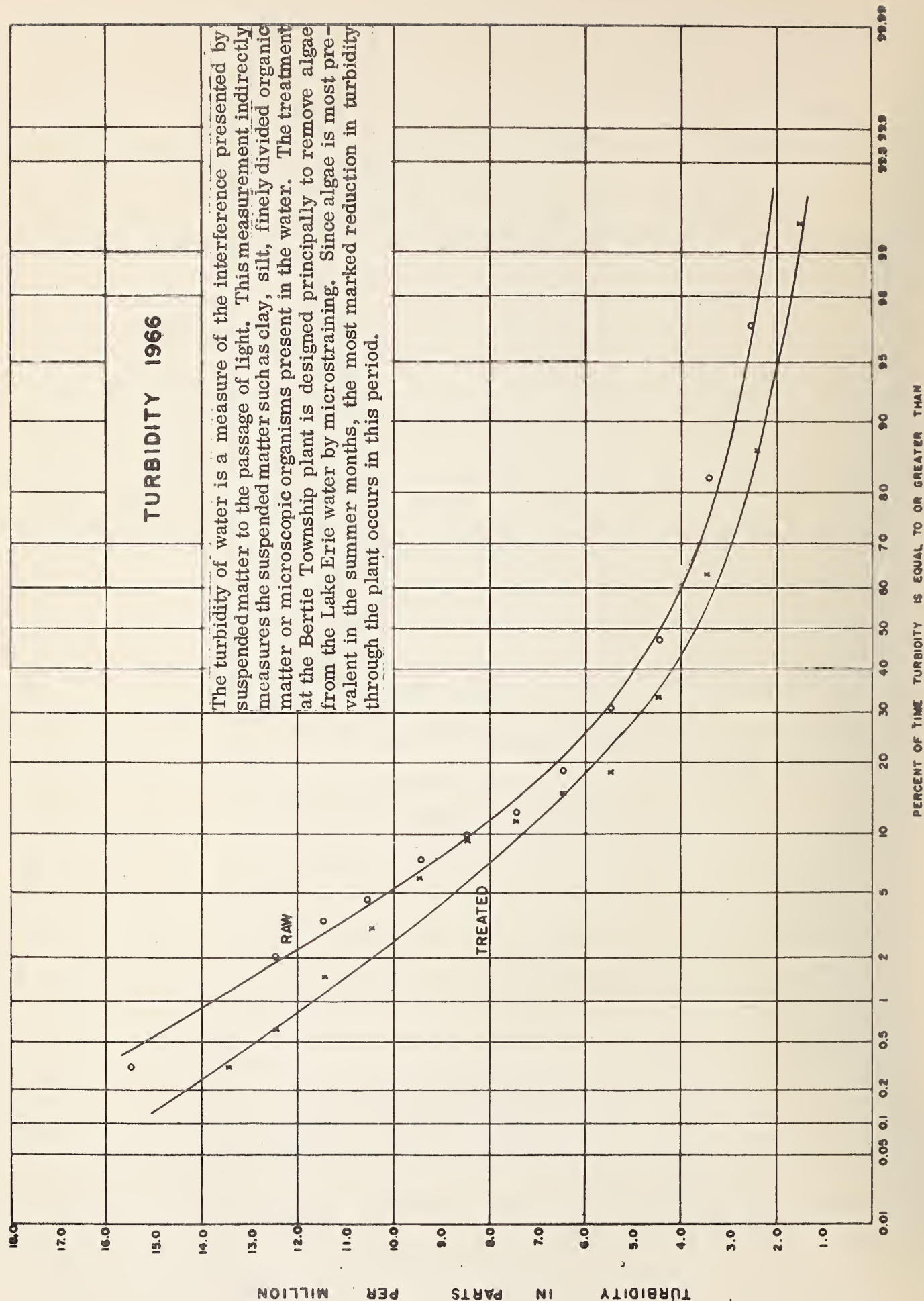
PERCENT OF TIME FLOW IS EQUAL TO OR GREATER THAN





# TURBIDITY 1966

The turbidity of water is a measure of the interference presented by suspended matter to the passage of light. This measurement indirectly measures the suspended matter such as clay, silt, finely divided organic matter or microscopic organisms present in the water. The treatment at the Bertie Township plant is designed principally to remove algae from the Lake Erie water by microstraining. Since algae is most prevalent in the summer months, the most marked reduction in turbidity through the plant occurs in this period.





### TURBIDITY

A definition of turbidity may be found on the graph at left. The Ontario Water Resources Commission objective for drinking water suggests a maximum turbidity of 5 ppm. This objective was achieved 75% of the time in 1966, as opposed to 78% of the time in 1965.

### BACTERIOLOGICAL ANALYSIS

A total of 96 samples were submitted to the Ontario Water Resources Commission laboratories for bacteriological analysis in 1966. A total of 72 treated water samples were taken from the plant and the distribution system and all of these were classified as grade "A" or satisfactory.

### CHEMICAL ANALYSIS

During 1966 samples of raw and treated water were analysed for iron, pH and fluorides. The results of these analyses along with accepted standards for good quality water are shown in the table below.

<u>LOCATION</u>	<u>IRON *</u>	<u>pH</u>	<u>FLUORIDES*</u>
Raw Water	0.28	8.0	0.1
<u>Dist. System</u> <u>North</u>	0.25	8.1	0.1
<u>Dist. System</u> <u>East</u>	0.12	8.1	0.1
<u>Dist. System</u> <u>West</u>	0.14	8.1	0.1
<hr/>			
OWRC Water Quality Objectives	0.3	6.7 to 8.5	1.0

Note: \* measured in ppm

## CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	27.842	255	0.92
FEBRUARY	25.482	245	0.96
MARCH	28.576	298	1.04
APRIL	29.581	292	0.99
MAY	33.431	400	1.20
JUNE	53.942	766	1.42
JULY	80.364	1260	1.57
AUGUST	57.760	765	1.32
SEPTEMBER	37.022	434	1.17
OCTOBER	35.403	381	1.08
NOVEMBER	31.137	316	1.01
DECEMBER	29.394	282	0.96
TOTAL	469.934	5694	-
AVERAGE	39.161	474	1.21

## COMMENTS

A total of 5694 pounds of chlorine were required in 1966 for disinfection as opposed to 4417 pounds in 1965. The increased consumption is due to an increase in water treated during the year.

## CONCLUSIONS

There was an increase in the total plant flow during 1965. This was due to both an increase in consumption during the peak summer months as well as an increase in average consumption during the rest of the year.

The bacteriological quality of the treated water was satisfactory during the year. There was a slight increase in treated water turbidities during the year indicating an increase in the raw water turbidities.

On July 14 a heavy algae blanket drifted over the plant intake and was subsequently drawn into the low lift pump wells. This was the first serious incident involving algae since start-up of the plant in 1961. The severe algae condition persisted for a period of ten days. At one stage it became necessary to shut the plant down while the staff removed the algae accumulations from around low lift pump intake screens. It is not anticipated that this condition will occur annually but in the event of a reoccurrence the plant staff will be in a better position to cope with the situation through the experience gained this past year.

By reason of a well executed preventative maintenance and housekeeping program, the plant structure, equipment and grounds were in excellent condition at the close of 1966. The staff are to be commended for their efforts in maintaining a high standard of excellence.

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